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NPIC/D-111-70

4 JUN 1970

MEMORANDUM FOR: Assistant Deputy Director for Intelligence

SUBJECT : Request for Approval of a Contract for
a Program of Research in Mensuration
Instruments with [REDACTED]
[REDACTED] from
FY-1970 R&D Funds

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1. This memorandum requests approval for the commitment of R&D funds for a NPIC contract. The specific request is stated in Paragraph 7.

2. The NPIC utilizes measurements of objects as an integral part of the imagery interpretation process. The measurements must be accurate and reliable in order to provide objective data to reinforce the essentially subjective process of imagery interpretation. If the NPIC is to maintain and improve the high quality of its mensuration products, it must have a fundamental understanding of the extent and magnitude of the errors which occur in the photographic measurement process. In order to gain an insight into the error problem, the NPIC initiated a Precise Mensuration Study in 1969. This program is primarily under the direction of IEG/PHD and is being successfully carried out in-house by NPIC personnel with limited outside contractor support supplied by TSSG/RED. This initial study will be completed by mid-1970 and will provide valuable information in the following areas: an error investigation of acquisition systems and ephemeris information; error propagation--effect of identified errors on reliability of results; establishing a ground truth data bank; testing stereoscopic versus monoscopic mensuration accuracy; and analyzing math models and computer programs currently in use. The In-House Precise Mensuration Study has given NPIC its first really hard look at the subject, but it has also made NPIC aware that there is a pressing need for applied research in measuring instruments, films and emulsions, and measuring standards used in precise measurement. The intent

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GROUP 1
Excluded from automatic
downgrading and
declassification

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of the proposed program is to investigate the problem areas which exist in measuring instruments. The results of this program will provide information as to improving present measuring devices or developing new instruments to meet the mensuration requirements.

3. The scope of work required to adequately cover all the major problem areas is immense and would be very difficult to control if undertaken at one time. In order to bring this into proper perspective, a program is proposed that divides the problem areas into individual tasks and each task into phases. Phase I will be funded in FY-1970 and includes those tasks which have the highest priorities. Phase II will be funded in FY-1971 (and possibly FY-1972) and covers the remaining tasks plus any new problem areas highlighted as a result of Phase I research. The priority areas selected for investigation in FY-1970 under Phase I are as follows:

a. Task I - Measurement of Color Photography. Evaluate and test the viewing systems, illumination, reticles and hold-down systems of present measuring instruments in regard to handling SO-242 and other advanced color imagery. Determine the modifications required for existing instruments and the specifications to be incorporated into the design of future measuring instruments to fully accommodate color.

b. Task II - Reticle Study. Investigate the optimum design and position of reticles for monoscopic and stereoscopic measuring.

c. Task III - Film Stability on the Measuring Instruments. Quantify the changes occurring in the film and emulsions during the measuring process because of temperature and humidity changes, film-hold down methods, light intensity, etc. Test dry versus wet process imagery and color versus conventional imagery to determine the local (small area) distortions taking place because of the concentration of light on that portion of the film being viewed as opposed to the change in total length of the film frame caused by the general environment.

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d. Task IV - Data Readout Control Modules. Research, test and evaluate, and recommend data readout control modules to replace the old and unreliable units presently in use in NPIC. Determine the modifications required to make the new modules compatible with the existing system.

e. Task V - Automatic Pointing. Investigate the future applications of automatic pointing in NPIC. Determine the accuracy of automatic pointing versus manual pointing and ascertain if this is the best technical equipment development approach for future mensuration.

The work plan for each task will generally follow this form: NPIC and the contractor will define the scope of each task; the contractor will perform a literature search; the contractor will design tests and perform the experiment after receiving NPIC approval; and the contractor will prepare a final report covering results and recommendations for equipment modification and specifications for future instruments. The deliverable items for Phase I under this contract are a final report covering each of the tasks and monthly progress reports. There is little technical risk involved in this program. The follow-on contracts for Phase II will depend entirely on the contractor's performance during Phase I.

4. Proposals were solicited from a limited number of contractors because of highly specialized capabilities and the security clearances required to perform the work. Proposals were submitted by two contractors for this program. The proposal submitted by [redacted] was selected because it clearly indicated that the contractor has a thorough understanding of the problem areas and because they presented the most realistic program for investigating the problems. The specialized imagery to be used on this project will be furnished by the Government. The measuring instruments used during the tests will be provided by the Government and the contractor.

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5. It is anticipated that successful completion of this contract will result in a follow-on contract in FY-1971 to proceed with Phase II; i.e., the major problem areas remaining and those new areas highlighted during Phase I. The cost of the follow-on work is estimated to be approximately [REDACTED]

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6. [REDACTED] will be the Project Officer for this contract. [REDACTED] is appropriate for this contract. The security classification of the work and reports will be assigned by the Project Officer.

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7. It is requested that approval be granted to negotiate an R&D contract with [REDACTED] at a cost not to exceed [REDACTED]

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for

ARTHUR C. LUNDAHL
Director

National Photographic Interpretation Center

Attachments:

1. Proposal
2. Form 2420

APPROVED: [REDACTED]

Assistant Deputy Director for Intelligence

8 JUN 1970
Date

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Distribution:

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NPIC/TSSG/RED/SDB [REDACTED] 19 May 70

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